

# New Records and Species of Biting Insects from the Ethiopian Region. V

by

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The types of the new species described in this paper are in the collection of the South African Institute for Medical Research, Johannesburg.

## CERATOPOGONIDAE

### **Bezzia hopkinsi** sp. nov. (Fig. 1 a, b.)

*Male.* A black species with the mesonotum and abdomen somewhat shiny. *Head*, face and frons black, eyes widely separated above, bare. *Palps*, 3rd segment not swollen, slightly longer than either 4th or 5th which are subequal. *Antennae* missing. *Thorax*, mesonotum black, somewhat shiny, without an anterior spine or tubercle; pleurae and scutellum black, latter with three heavy, long, spine-like bristles and some small hairs. *Wing*, length 1.3 mm, greatest width 0.4 mm; macrotrichia absent, microtrichia large and dense, alula bare; costa reaches 0.7 of the wing length, fork of the cubitus well beyond the cross vein. *Legs*, mainly dark; femora blackish, on the fore legs with a prominent narrow subapical pale band and three heavy, short, black spines. other femora unarmed; tibiae of mid and hind legs dark brown with an ill-defined narrow subbasal pale band, of fore legs with a narrow subbasal pale band and a wider one subapically; tarsi yellowish, 4th segment cordiform. *Abdomen*, black, slightly shiny in some lights. *Terminalia*, of the type seen in *flavicorporis* de M. 1939 and *lucida* de M. 1939, but fused parameres broader apically and aedeagus sharply pointed apically.

Holotype ♂ bred from wet mud on edge of stream, Kumba, British Cameroons. 14.11.51 (C. A. Hopkins).

Related to *flavicorporis* de M. 1939 and *lucida* de M. 1939. From the former immediately separable because of the dark abdomen and greatly lengthened aedeagus. From the latter by larger size, presence of 3 and not 2 black spines on femora and long sharply pointed aedeagus. Two African species namely *foyi* I & M 1921 and *de Wulfi* Goetgh. 1935, of which females only are known, may belong to either *lucida* or *hopkinsi*.

### **Stilobezzia bata** sp. nov. (Fig. 1 i, j.)

*Female.* A small species with shiny black thorax and abdomen, coxae and legs markedly paler. *Head*, eyes widely separated, bare. *Palps*, 3rd and 5th segments subequal, each nearly twice as long as the 4th, 3rd not swollen. *Antennae*, yellowish, relative lengths and greatest widths as follows:

Segment	3	4	5	6	7	8	9	10	11	12	13	14	15
L	13	8	8	8	8	8	8	9	20	20	20	22	27
W	5	4	4	4	4	4	4	4	4	4	4	4	4

Segments 4-10 slightly barrel-shaped, 15 without a terminal style. *Thorax*, mesonotum and scutellum shiny black, latter with two central and one marginal on each side; pleura very dark brown. *Wings*, length just under 1 mm, greatest width 0.3 mm, translucent, macrotrichia absent, microtrichia large and dense; costa reaches about 0.6 of the wing length and ends before the end of Cul; 1st radial cell minute, second long and well-formed; median with a very long petiole, fork approximately opposite that of the cubitus; alula bare. *Legs*, including coxae, pale yellowish; femora unarmed; 4th tarsus slightly bilobed, 5th long on all legs, slightly longer than 3rd and 4th together and provided with a pair of fairly stout spines basally; claws on all legs long, single, each with a prominent basal barb. *Abdomen*, shiny black or very dark brown. *Spermathecae*, two, one large, at least  $52\mu$  long, sac-like, collapsed, the other much smaller, spherical, measuring about  $16\mu$  in diameter, both feebly pigmented.

Holotype ♀, bred from wet ground on edge of stream, Kumba, British Cameroons, 14.11.51, paratype ♀, bred from swamp, Marombi Kang, Kumba, British Cameroons, 11.9.51 (C. A. Hopkins).

This species comes nearest *parvula* Goetgh. 1933 from the Belgian Congo, it differs in having the scutellum dark, no macrotrichia and the alula bare.

### *Atrichopogon victoriae* de Meillon 1942 (Fig. 1 c, d, e.)

*Female*. Hitherto undescribed. In general appearance as in *hirsutipennis* I & M 1923 for which it was at first mistaken. *Head*, eyes touching, densely hairy as in the male, the individual hairs reaching well beyond the apices of the facets. *Palps*, poorly developed, hardly extending beyond the apex of the proboscis, 2nd and 3rd segments approximately subequal, each longer than the 4th and 5th which are subequal, 3rd very slightly swollen and with a marked sensory pit. *Antennae*, relative lengths and widths of the segments as follows:

Segment	3	4	5	6	7	8	9	10	11	12	13	14	15
L	9	7	7	7	7	7	7	7	12	11	12	13	20
W	8	8	8	8	8	8	8	8	8	7	7	7	7

Apical segment with a terminal style measuring about  $12\mu$ .

*Thorax*, mesonotum, scutellum, pleurae and halteres as in *hirsutipennis*. *Legs*, straw-coloured, tarsal ratio about two, claws small, split apically and each talon with a prominent basal tooth; empodium well developed. *Wings*, length 1.2 mm., greatest width 0.5 mm.; much as in *hirsutipennis* but not quite so hairy, in the cubital cell for instance about 15 macrotrichia as against

over 50 in *hirsutipennis*; microtrichia large, very dense; costa ends about opposite Cul, first radial cell open, about one third length of second; bifurcation of cubitus slightly distal to the cross vein. *Abdomen*, sternite 7 unique, armed with a pair of large, strong, black, curved serrated spines on each side. *Spermatheca* dark, pear-shaped, the duct not pigmented, the area at the apex with some small circular clear areas.

1 ♀, Berg River, Fransch Hoek Forest Reserve, Cape Province, 14.4.53 (A. D. Harrison). Taken at the same time were two males, this together with the hairy eyes makes it a reasonable assumption that the female is correctly associated.

Among Ethiopian species with hairy eyes *victoriae* is immediately separable by the intensely hairy wing and peculiar serrated spines of the seventh sternite.

***Atrichopogon melanimum* Ingram & Macfie 1923.**

The males before me agree in all details with this species originally described from Mossel Bay. It seems pretty certain that the females, taken by Mr. Harrison, at the same time and place as the males, belong to the same species.

*Female*. A dark brown insect with moderately shiny mesonotum, pale brown scutellum, dark wings with macrotrichia apically and light brown legs. *Head*, very dark brown, eyes very narrowly separated, densely hairy. *Palps*, 3rd segment longest, slightly swollen and with a deep sensory pit, 4th segment slightly shorter than 5th. *Antennae*, relative lengths and widths of the segments as follows:

Segment	3	4	5	6	7	8	9	10	11	12	13	14	15
L	10	6	6	6	7	7	7	7	20	19	19	22	25
W	10	9	9	9	8	8	8	7	7	7	7	7	6

Terminal segment with a short style measuring about 12  $\mu$ . *Mesonotum*, very dark brown, somewhat shiny, without any paler or darker markings; scutellum pale brown with four large bristles and some small hairs; halteres with pale crowns. *Wings*, length 1.5 mm., greatest width 0.54 mm.; dark as in *natalensis* I & M 1923 but with the costa ending opposite the termination of Cul and fork of the cubitus opposite middle of first radial cell which is well developed; macrotrichia dense apically but only about three in the cubital and nine in the anal cell. *Legs*, pale brown, tarsal ratio about three. *Spermatheca*, large oval, measuring  $108\mu \times 80\mu$  with the duct unpigmented and numerous small clear areas basally. 11 ♀♀ from Paarl, Piquetberg & Wellington, Cape Province. January 1953, December 1952. (A. D. Harrison).

***Atrichopogon turneri* Ingram & Macfie 1923. (Fig. 1 f, g. h.)**

The females before me resemble this species in most respects, the shiny brown mesonotum so characteristic of my specimens, however, are not mentioned by Ingram and Macfie. It also resembles *chrysosphaerotum* Ingram & Macfie

1921 but the terminal segments longer and hence as in *turneri*. Taken with the females were a number of males hitherto unknown.

*Male*. Vertex, clypeus, antennae and mouth parts black. *Palps*, the relative lengths of segments 2-5 are 8, 10, 6, 6; 3rd slightly swollen with a deep sensory pit at about the middle. *Antennae*, the relative lengths and widths of the segments as follows:

Segment	3	4	5	6	7	8	9	10	11	12	13	14	15
L	16	10	10	10	10	10	10	8	9	11	24	21	26
W	7	9	9	9	8	8	8	7	7	5	5	5	5

*Thorax*, mesonotum very dark brown, shiny; pleurae a shade paler; scutellum as mesonotum; halteres with yellowish knobs. *Wings*, length 1.3 mm., greatest width 0.4 mm., as in the female but narrower, no macrotrichia. *Legs*, uniformly pale brown, tarsal ratio about  $2\frac{1}{2}$ . *Abdomen*, dark brown. *Terminalia*, ninth sternite not excavated; coxites normal, claspers tapering rather suddenly beyond the middle; aedeagus of an anterior and a posterior part best seen in side view as illustrated; somewhat as in *chrysosphaerotum*. 12♂♂ 12♀♀ Platteklip, Table Mountain, Cape Province, 22.1.53 (A. D. Harrison).

#### **Atrichopogon hirsutipennis** Ingram & Macfie 1923.

There is now little doubt that the male described by de Meillon as *helion* 1936, in reality belongs to *hirsutipennis*. I have a large number of specimens from Cape Province, Transvaal and Zululand and the slight difference in the aedeagus is not real. It is furthermore worth noting that in my specimens the scutellum and shoulders are quite dark and not as described by Ingram and Macfie.

#### **Alluaudomyia vudu** sp. nov. (Fig. 1 k, l, m, n.)

A striking species with spotted mesonotum and wings.

*Male*, face clypeus and mouth parts dark brown; eyes separated, bare. *Palps*, small, segments 2-5 with relative lengths 5, 7, 6, 9; 3rd segment not swollen, provided with a small sensory pit bearing some long papillae. *Antennae*, torus very dark brown, flagellar segments light brown, verticils yellowish; relative lengths and widths of the segments as follows:

Segment	3	4	5	6	7	8	9	10	11	12	13	14	15
L	22	10	8	8	8	8	8	8	8	11	22	24	26
W	7	6	6	5	5	5	5	4	4	4	4	5	6

Segments 4-10 more or less fused and not clearly differentiated, terminal segment gradually pointed. *Thorax*, mesonotum creamy with small black dots and pale hairs except on the prescutellar area where a few stout black setae occur; scutellum and postnotum coloured as mesonotum but with a median

dark stripe; pleura creamy on upper half, dark brown on lower. *Wings*, length 1.2 mm, greatest width 0.4 mm; with a few macrotrichia apically and no microtrichia; dark spots clearly defined and not surrounded by paler markings or pigment; alula bare. *Legs*, femora with about the basal half or more and extreme apex dark; hind tibia dark at apex and base and with a narrow median dark band; fore and mid tibiae dark on about the apical half and extreme base; 1st hind tarsus all dark, rest of tarsi paler; fore tibia with a rather large subapical, pale, anterior spine; legs otherwise unarmed except for usual bulbous hairs; claws subequal, small, bifid apically. *Abdomen*, dark brown but tergites 6, 7 and 8 yellowish, 9th segment and terminalia very dark brown and contrasting sharply with the rest of the abdomen. *Terminalia*, 9th segment and terminalia rigid, heavily pigmented, large; aedeagus in the form of a heavily pigmented basal semicircular ring with a median apical projection of complicated structure; parameres separate, each consisting of a heavily pigmented, sharply pointed, flat plate orientated in a dorso-ventral axis, posteriorly each paramere with a group of heavy spines as illustrated.

*Female*, as in the male but slightly larger and mesonotum more yellowish. *Head*, eyes narrowly separated in front, widely behind. *Palps*, 3rd segment as in the male, the relative lengths of the segments are 7, 8, 7, 12. *Antennae*, the relative lengths and greatest widths as follows:

Segment	3	4	5	6	7	8	9	10	11	12	13	14	15
L	13	10	10	10	10	11	12	14	18	17	19	20	25
W	6	5	5	5	5	5	5	5	5	5	5	5	5

*Thorax*, mesonotum yellow with small dark spots as in the male. *Wings*, with more macrotrichia than in the male, these being present in the cubital and anal cells and in the median cell reaching as far back as the fork; microtrichia absent; vein structure and ornamentation as in the male. *Legs*, as in the male but claws on all legs very unequal the shorter talon hardly reaching the middle of the longer one. *Abdomen*, dark brown but apical four to five segments entirely yellowish. *Spermatheca*, large, pyriform, well pigmented, measuring  $116 \times 80\mu$ .

Holotype ♂, paratypes 3 ♂♂, 3 ♀♀, bred from swampy mud, Kumba, British Cameroons, 9.8.51 (C. A. Hopkins).

Resembles *melanostictus* I & M. 1922 from the Gold Coast most closely. The male differs in the terminalia especially the aedeagus and parameres, also the wing has more macrotrichia. The female from Egypt ascribed to *melanostictus* by Macfie (Bull. ent. Res. 15, 66, 1924) differs from the male very markedly and may very well not be this species at all. Its resemblance to *vudu* is obvious and it may indeed be this species.

I have several specimens of *melanostictus* in my collection. The males agree in all respects with the original description and the females resemble the males. I have little doubt that the association of the sexes in these specimens is correct. The females resemble *melanostictus* males and differ from Macfie's

female from Egypt and *vudu* in wing ornamentation in that the prominent black spots on  $M_1$  and  $M_2$  are missing. This is a very easy character to see and no variation has been noted. Further my *melanostictus* females, and males for that matter, are readily separable from *vudu* by the sharply and plainly banded legs.

My summing up of the position is that Macfie's female from Egypt is not *melanostictus* but another species identical with or closely related to *vudu*. This opinion is based on the following specimens of *melanostictus*.

1 ♀, Sinoi and 1 ♀ Salisbury, Southern Rhodesia 5.3.42 (C. V. Meeser).

2 ♂ ♂, 2 ♀ ♀, Onderstepoort, Transvaal 18.2.42 & 15.2.43 (R. du Toit).

***Stilobezzia ugandae* I & M. 1923.**

This species was originally described from a single female taken in *Uganda*. It has not been recorded since. In the original description mention is made of the presence of a small lozenge-shaped first radial cell though this cell is obscured by a dark patch in the accompanying illustration. Johannsen (Bull. Bishop Mus. 189, 191, 1946) was obviously misled by this illustration when he suggested that *ugandae* had the first radial cell missing.

Two females before me from West Africa undoubtedly belong to the same species and in both of them the first radial cell is small but very distinct and easily seen. It is necessary to emphasize that the relatively small single claw is of the same size on all legs and that the basal barb is minute. The mesonotal pits are well marked and the alula appears to be bare.

It is obvious that *ugandae* must remain in the genus *Stilobezzia*.

2 ♀ ♀, bred from leaf mould at base of palm tree, Barombi Kang, Kumba, British Cameroons, 11.9.51 (C. A. Hopkins).

***Parabezzia capensis* sp. nov. (Fig. 2 a, b, c.)**

*Male*. A dark brown shiny species; antennae without verticils and the last five segments elongated as in the female; hypopygium enlarged, the coxites considerably so. *Head*, dark brown; vertex with numerous stiff, sharply pointed, bristles; eyes widely separated, hairy all over; clypeus with a few small hairs. *Palps*, 2nd, 3rd and 5th segments approximately subequal and the 4th much smaller; 3rd slightly inflated with a prominent sensory pit. *Antennae*, 1st segment relatively large with one long, stiff, sharply pointed bristle and a small hair; torus with several bristles, pear-shaped and only a little longer than broad; the relative lengths and breadths of the segments as follows:

Segment	3	4	5	6	7	8	9	10	11	12	13	14	15
L	10	7	6	6	6	6	6	6	18	16	15	16	19
W	6	5	5	5	5	4	4	4	6	6	6	6	6

Verticils absent, the segments with short bristles only, terminal segment smoothly rounded apically. *Thorax*, mesonotum dark brown, somewhat shiny

with numerous short, stiff and some long sharply pointed black bristles; mesonotal pits absent; pronotum with at least two stiff bristles as on mesonotum; scutellum a shade paler with several long bristles and a few small hairs; postnotum black, bare. *Legs*, strong, dark brown throughout and well supplied with stiff bristles; femora unarmed; tibia of fore leg with a transverse comb of colourless spines at the apex and a subapical patch of short, black, blunt spiniform bristles; of the mid leg unarmed; of hind leg with an apical comb of six long bristles preceded by a transverse closely set comb of shorter pale bristles, subapically a patch of numerous small, thick, spines not so black or blunt as on fore leg; tarsi of fore leg unarmed, of mid leg with base of first with one and apex with two spines; apex of second with two spines, rest unarmed; of hind leg first tarsus with a spine at base and apex and an anterior comb of bulbous hairs, second tarsus as first but bulbous hairs less closely set, rest unarmed; fifth tarsus on all legs elongated much longer than the fourth which is cordiform; claws on all legs small, subequal, simple, with bifid apices.

*Wings*, length from the arculus 1.2 mm., greatest width 0.5 mm.; microtrichia numerous, dense, macrotrichia — except for a few along the border — absent; one radial cell; median petiolate; costa reaching five sixths of the wing length; alula bare. *Abdomen*, dark brown, shiny, well supplied with stout bristles. *Terminalia*, large and heavily pigmented; 9th sternite broad; aedeagus strong with a median apical rod-like projection carrying a tooth near the middle; coxites bulbous; styles stiff, each ending in a bifid point; parameres separate, each consisting of a flat strip of moderately pigmented chitin and ending in a foot-like termination; 9th tergite reaching halfway to apex of coxites, median, lobe enormous, reaching to apex of coxite and with large wing-like projection at each lateral apical angle.

*Female*. As in the male but slightly larger, wing measuring 1.4 mm. in length. *Head* as in male but mandibles strongly toothed. *Antennae*. segments with relative lengths and widths as follows:

Segments	3	4	5	6	7	8	9	10	11	12	13	14	15
L	16	12	7	7	7	7	7	8	17	19	19	18	20
W	15	7	7	6	6	6	5	5	5	6	6	6	6

*Thorax*, as in male. *Legs*, as in male but claws slightly larger, each talon with a sub-basal tooth on all legs. *Spermathecae*, two, large pyriform, pigmented, nearly subequal, one measuring  $76 \times 60\mu$  and the other  $64 \times 52\mu$ , approximately  $32\mu$  of the duct of each pigmented.

Holotype ♂, paratypes 1♂, 2♀, Simondium, Cape Province; 2♂♂, 6♀♀. Fransch Hoek Forest Reserve and 1♂ Upper Fransch Hoek Forest Reserve, 30.7.52 (A. D. Harrison).

I place the above species in *Parabezzia* in spite of some peculiar features. The only other alternative would be to erect a new genus which, when it is considered that the genera already in existence can often not be recognized, is

most undesirable. Two other species from the Ethiopian Region are questionably referable to *Parabuzzia* namely, *P. poikiloptera* I & M 1922 and *Stilobezzia ugandae* I & M 1923. From these *capensis* is immediately separable because of its unadorned wings. According to Wirth (Proc. ent. Soc. Wash., 54, 22, 1952), who has redefined the genus, only three species hitherto described belong to the genus namely, *petiolata* Malloch 1915 (genotype) from Illinois, *inermis* (Coquillett) 1902 from Arizona and *pellucida* (Ingram & Macfie) 1931 from Argentina. The species described here does not conform with Wirth's redefinition e.g. parameres separate as in *Stilobezzia*, male antennae without plumes, fifth female tarsus not stout or laterally compressed.

**Alluaudomyia bimater** de Meillon 1953. (Fig. 2 d.)

*Male*. Previously undescribed. Colouration as in the female but a shade darker; antennae without long verticils; wing with less macrotrichia but microtrichia dense. *Head*, as in the female, elongate; eyes widely separated above but practically touching in front, densely hairy the individual hairs projecting well beyond the apices of the facets. *Palps*, relative lengths of segments 2-5 are 11, 15, 8, 14; 3rd slightly swollen with a deep sensory pit. *Antennae*, generally as in the female with enlarged 1st segment and 11-15 elongated; no verticils or long hairs arranged in rows; the relative lengths and widths of the segments are:

Segment	2	3	4	5	6	7	8	9	10	11	12	13	14	15
L	18	12	9	9	9	7	7	7	7	16	16	16	15	22
W	15	6	7	6	6	4	4	4	5	5	5	5	5	5

*Thorax*, dark brown to black, somewhat shiny. *Wings*, length 1.5 mm., greatest width 0.6 mm.; structure as in female but with fewer macrotrichia there being only a few beyond the end of the costa and at the apex of the median cell; microtrichia dense. *Legs*, dark brown, as in the female but claws on all legs subequal and each talon with a sub-basal tooth. *Terminalia*, style with a few black tubercles basally; 9th tergite short, each lateral apical angle produced; sternite membranous and densely spiculate; aedeagus nearly triangular in shape; parameres separate, feebly pigmented.

1♂, Upper Fransch Hoek Forest Reserve, Cape Province, 30.7.52. (A. D. Harrison).

As in the female the male is immediately separable from other *Alluaudomyia* because of the well developed 1st radial cell. In spite of the hairy eyes and presence of microtrichia I have no doubt that the above specimen is correctly associated with *bimater*. These characters are obviously not of such fundamental importance as was formerly supposed.

**Ceratopogon (Brachypogon) corius** sp. nov. (Fig. 2 e, f, g.)

*Male*. A small somewhat shiny black midge with no pale markings.



*Head*, eyes widely separated, densely hairy all over. *Palps*, segments 2-5 with relative lengths 7, 7, 5, 8; 3rd swollen with a prominent sensory pit. *Antennae*, tori very large almost touching internally; 1st segment a mere strip of chitin without any bristles; 3rd with a very long stalk; 4-12 fused; 13-15 with relative lengths and widths as follows:  $18 \times 4$ ,  $13 \times 4$  and  $12 \times 5$ ; terminal segment without a stylet. *Thorax*, mesonotum with some black bristles and no sensory pits; scutellum with two central and one lateral bristle on each side. *Legs*, unarmed, 1st hind tarsus slightly shorter than 2-4 combined; 4th cylindrical. *Wing*, length 0.76 mm., greatest width 0.3 mm., devoid of macro- and microtrichia; costa barely reaches middle of wing and ends approximately opposite bifurcation of cubitus; no radial cells; M2 wanting and M1 ending before the wing margin; both branches of the cubitus end before the wing margin; alula bare. *Terminalia*, small; style longer than coxite, aedeagus large but membranous except laterally where well pigmented; parameres feebly pigmented and difficult to see, apparently separate.

Holotype ♂, Fransch Hoek Forest Reserve, Cape Province, 20.1.53, paratypes 2♂♂, one from the type locality and the other from Piquetberg, Cape Province, 28.1.53 (A. D. Harrison).

This is the second species of *Brachypogon* from the Ethiopian Region, the other being *africana* de M. 1929. The new species differs in many respects from the latter e.g. hairy eyes, fused antennal segments, structure of terminalia. The reduction of wing veins seems to be going on apace in this subgenus. In the present species none of the veins, except the radius, reach the border of the wing.

***Nilobezzia capensis* sp. nov. (Fig. 3 a, b, c, d.)**

*Female*. A greyish species with milky white wings, pale tarsi and a whitish abdomen. *Head*, face greyish with a few pale hairs; frons black; occiput grey; mouth parts brown; eyes touching. *Palps*, small. *Antennae*, black, short, the relative lengths and breadths of the segments are:

Segment	3	4	5	6	7	8	9	10	11	12	13	14	15
L	16	9	9	9	9	9	9	9	14	15	15	16	19
W	10	8	6	6	6	6	6	6	6	6	6	5	5

*Thorax*, uniformly dull grey with a faintly marked median stripe, bare except above the wing roots where there are a few bristles; pleura grey to dark brown, bare; scutellum straw coloured with a single row of about 13 bristles; postnotum greyish; halteres with pale crowns. *Wings*, length 2.5 mm., greatest width 0.8 mm., costa reaches nearly four fifths of the wing length; macrotrichia absent, microtrichia minute or absent over most of the wing surface except the alula; alula fringed, the individual hairs being bent or twisted; wing fringe of simple, short, setae all approximately of the same length. *Legs*, femora and tibiae black; tarsi 1-4 pale with apices darkened, 5th black; hind femur and tibia with a row of widely spaced stiff bristles;

5th tarsus on all legs with 10-12 black battonets; claws on all legs long, subequal and each talon with a strong basal barb. *Abdomen*, dull white dorsally except extreme apex which is brown.

*Male*. Uniformly dark brown except for slightly paler tarsi. *Head*, almost entirely occupied by the eyes which meet above and nearly touch below the antennae; occiput brown; mouth parts very feebly developed. *Palps*, minute, measuring about  $60\mu$  in total length, segmentation imperfect. *Antennae*, short, just over half as long as the head is wide; the relative lengths and widths of the segments as follows:

Segment	2	3	4	5	6	7	8	9	10	11	12	13	14	15
L	15	12	3	3	3	2	2	2	3	2	4	8	8	9
W	20	10	8	6	6	6	6	5	5	5	5	5	5	5

*Thorax*, uniformly dark brown; pleurae similar; scutellum a shade paler; postnotum dark brown; halteres with pale crowns.

*Wings*, length 1.4 mm., greatest width 0.5 mm., costa reaches five sevenths of the wing length; fork of the cubitus approximately under the cross vein; macrotrichia absent, microtrichia absent or minute; alula with twisted bristles as in the female; fringe simple. *Legs*, as in the female but fifth tarsi unarmed, claws simple and small. *Abdomen*, dark brown but with a greyish sheen in some lights. *Terminalia*, 9th segment well developed and pigmented, tergite relatively large; coxite poorly developed, style absent; aedeagus deeply pigmented and rigid with a pair of hooks near the apex; parameres fused basally separated, but closely approximated apically.

Holotype ♀, paratypes 2 ♂♂, 3 ♀♀, also 3 ♂♂, 4 ♀♀, Berg River, Piquetherg, Cape Province, 16.2.53 (A. D. Harrison).

Ten of the adults, including males and females, were bred from larvae collected in sand in shallow water of the Berg River. Two further females were taken in a net in which one attacked and killed the other. The pupal pelts of all the bred specimens appear to be identical. There is therefore little doubt that the males and females are correctly associated. The male agrees very well with the description of *Crespinia* Kieffer 1923, of which a single specimen, a male, is known. There seems little doubt that this genus must fall as a synonym under *Nilobezzia*.

This is the fourth species of *Nilobezzia*, and the first male, to be described from the Ethiopian Region. The female differs from *hunyani* de M. 1943 and *armata* Kieffer 1921, in having the eleventh antennal segment less than twice as long as the tenth and from *spekei* Macfie 1939, in the shortness of the terminal antennal segment, absence of gland rods and other details.

### **Forcipomyia mopsus** sp. nov. (Fig. 3 e, f, g, h.)

*Male*. A small shiny black species with unmarked wings. *Head*, vertex, clypeus and mouth parts black; eyes narrowly separated, bare. *Palps*, segment 3 slightly swollen medially and with a sensory pit, about twice as long as 2

and exceeding 4+5 in length; 4 and 5 subequal. *Antennae*, relative lengths and widths of the segments are:

Segment	3	4	5	6	7	8	9	10	11	12	13	14	15
L	17	10	10	9	9	9	10	10	11	42	18	16	18
W	8	11	11	10	10	8	8	7	7	6	6	6	6

Terminal segment with a prominent knob-like style  $12\mu$  long. *Thorax*, mesonotum shiny black with numerous long black bristles; scutellum shiny black with about 10 long black bristles; halteres with white crowns. *Wings*, length 1.4 mm., greatest width 0.4 mm., a single radial cell, costa not reaching to the middle of the wing; unadorned and without the usual white mark at the end of the costa. *Legs*, femora and tibiae blackish, tarsi a shade paler, hind basitarsus more or less as long as the second segment. *Abdomen*, shiny black. *Terminalia*, as in *ingrami* Carter 1919 and *stanleyi* Macfie 1939 but aedeagus quite different and the shiny black colour of the adult immediately separates it from both.

Apart from the two species mentioned above *mopsus* resembles *nigricoxis* Goetghebuer in colour. The terminalia of the latter have not been described and the tarsal ratio is given as 0.6 whereas it is 1 in the new species.

*Female*, a small very dark insect without any ornamentation, mesonotum shiny black or very dark brown, scutellum a shade paler, halteres whitish. *Head*, vertex somewhat shiny; eyes narrowly separated. *Palps*, relative lengths of segments 2-5 are 10, 22, 13, 7; 3rd slightly swollen medially with a prominent sensory pit. *Antennae*, the relative lengths and widths of the segments are:

Segment	3	4	5	6	7	8	9	10	11	12	13	14	15
L	10	7	7	7	8	8	8	9	12	12	12	12	15
W	7	6	6	6	6	6	6	6	6	6	6	6	6

*Thorax*, shiny black or very dark brown, covered with yellowish hairs; scutellum a shade paler with about ten long black bristles and some small hairs; halteres with pale crowns. *Wings*, length 1.2 mm., greatest width 0.5 mm.; macrotrichia dense throughout, microtrichia absent; costa ends before the middle of the wing; fork of the cubitus approximately opposite the end of the costa. *Legs*, straw coloured throughout. *Abdomen*, very dark brown above, rather dull and without any paler markings; sternites a shade paler. *Spermatheca*, single, highly pigmented, pear-shaped, measuring  $76 \times 48\mu$ .

Holotype ♂, Kirstenbosch, Cape Province, 5.12.52; paratypes 2 ♂♂, 3 ♀♀, Upper Fransch Hoek Forest Reserve, 3.12.52 and 9.1.53 (A. D. Harrison).

#### ***Palpomyia oliffi* sp. nov. (Fig. 4 a, b, c, d.)**

*Male*. A medium sized dark brown species without any marked ornamentation, femora of all legs armed. *Head*, mouth parts, clypeus and

vertex dark brown; eyes widely separated, bare. *Palps*, relative lengths of segments 2-5 are 11, 15, 11, 14; 3rd not swollen, without a sensory pit. *Antennae*, dark brown, verticils poorly developed, relative lengths and widths of the segments as follows:

Segment	2	3	4	5	6	7	9	10	11	12	13	14	15
L	25	11	11	10	10	10	10	10	10	15	32	32	35
W	8	7	7	7	6	6	6	5	5	5	6	5	5

*Thorax*, mesonotum and pleurae very dark brown, shiny, without a frontal tubercle and covered with numerous small stiff hairs; scutellum a shade paler; halteres dark. *Legs*, without any prominent markings or banding; coxae, mid and fore femora brown, hind femur, and tibiae of all legs, blackish; tarsi paler; each femur with 3-4 short, stout, black, spines; 4th tarsus short, somewhat cordiform. *Wings*, length 1.8 mm, greatest width 0.5 mm.; unadorned, devoid of macrotrichia, microtrichia dense; costa reaches about 0.8 of wing length; 2nd radial cell about twice length 1st; fork of cubitus just beyond the crossvein; Cul ends approximately opposite end of costa; fringe normal, alula bare. *Abdomen*, very dark brown, shiny. *Terminalia*, 9th tergite as usual in this genus; coxites peculiar in having a very large internal lobe; style gradually narrowing to a hyaline termination; aedeagus hairy, well pigmented with a pair of apical hyaline wing-like projections; parameres fused near extreme base, otherwise narrowly separated.

*Female*. Larger and slightly paler than the male, basal portion of the abdomen clear yellow. *Head*, as in the male. *Thorax*, brown with some ill-defined darker markings; scutellum as in male; halteres a shade paler. *Legs*, largely as in the male but with exception of hind femur and tibia, slightly paler; femora armed as in the male; claws small, subequal, barbed on all legs. *Wings*, length 2.6 mm, greatest width 0.8 mm; structure largely as in the male but second radial cell nearly three times length of 1st and costa ending slightly beyond the termination of Cul. *Abdomen*, slightly more than basal half clear yellow, rest dark brown; gonapophyses well developed as a pair of suspended flaps best seen in side view as illustrated. *Spermathecae*, three, two large, well pigmented, pyriform, approximately subequal, the larger measuring  $76 \times 56 \mu$ , each with about  $16 \mu$  of the duct pigmented; the third spermatheca is small, about  $24 \mu$  in length, pigmented and irregular in shape.

Holotype ♂, paratypes 2 ♂♂, 1 ♀, Giants Castle Camp, Bushmans River, Natal, 18.9.53 (W. D. Oliff).

The female comes near *bicolor* Macfie 1941 from Nyasaland differing in having at most 4 and not 11-12 spines on the fore femora, only the basal half of the abdomen pale, well developed gonapophyses and no gland rods. In external characters the male somewhat resembles *spinulosa* Goetghebuer 1935 from the Belgian Congo in which, unfortunately, the terminalia have not been described; however, this species is said to have fCu under the middle of R1, antennal segment 12 as long as 15 and 13 the shortest.

**Ceratopogon (Ceratopogon) alcides** sp. nov. (Fig. 4 e, f, g, h, i.)

*Male.* A small black species with white halteres. *Head*, black, eyes widely separated, hairy. *Palps*, small, relative lengths of the segments 2-5 are 6, 7, 5, 7; 3rd slightly expanded apically at the site of a prominent sensory pit. *Antennae*, verticils black; segments 4-12 fused, 13-15 with relative lengths and widths as follows:  $20 \times 4$ ,  $15 \times 4$ ,  $20 \times 4$ ; terminal segment gradually narrowed to a blunt point. *Thorax*, mesonotum, scutellum and pleurae black, shiny; mesonotal pits not prominent; halteres white. *Legs*, greyish, hind femur darker; unarmed, but hind tibia with a row of long stiff hairs along the posterior border; 4th tarsus short, cylindrical; claws small, subequal, bifid apically. *Wings*, length 1.0 mm, greatest width 0.4 mm; two radial cells, both poorly formed; costa reaches to about the middle of the wing; fork of the cubitus approximately opposite end of costa; M1 narrowly interrupted basally; macrotrichia fairly dense above M1, elsewhere largely confined to the veins; microtrichia absent, fringe normal, alula bare. *Abdomen*, shiny black. *Terminalia*, 9th tergite with a very long apical lateral process on each side; sternite broad; coxite longer than broad, gradually narrowed; style gradually narrowed to a rather blunt turned-down apex; aedeagus a simple ventral transparent plate carrying posteriorly a complicated highly pigmented structure as illustrated; parameres large, well pigmented, separate. Holotype ♂, paratype ♂, Gladstone Nose, Upper Mooi River, Natal, 30.9.53 (W. D. Oliff).

Resembles *natalensis* de M 1937. It is immediately separable in having more abundant macrotrichia on the wing. The male terminalia is quite distinct.

**Ceratopogon (Ceratopogon) meeseri** sp. nov. (Fig. 4 j, k.)

*Male.* A small black species with spotted wings. *Head*, black, eyes separated, bare. *Palps* small, 3rd segment not swollen, no marked sensory pit. *Antennae*, segments 4-11 fused, verticils well-developed; relative lengths and widths of 12-15 as follows:  $8 \times 4$ ,  $16 \times 4$ ,  $13 \times 4$ ,  $16 \times 4$ . *Thorax*, black with some ill-defined greyish markings, scutellum and pleurae black. *Legs*, dark with narrow subapical pale bands on femora and similar subapical and subbasal bands on tibiae; unarmed; 4th tarsal segment short; claws short, subequal, bifid apically. *Wings*, length 0.8 mm, greatest width 0.3 mm; costa reaches middle of wing; no radial cells; end of costa, fork of median and fork of cubitus in a straight line; infuscated basally and with four clearly defined black spots as shown; macrotrichia present near dorsal margin and a few at the apex near M1, microtrichia absent; fringe normal; alula bare. *Abdomen*, black. *Terminalia*, 9th tergite with fairly long apical lateral processes sternite produced into two lobes which cover the base of the aedeagus; coxites longer than broad, gradually narrowed; style gradually narrowed to end in a beak-like termination; aedeagus well pigmented, shaped like an inverted Y; parameres large, separate, well pigmented, each with an expanded termination which in ventral view is beak-like.

Holotype ♂, Hunyani River, Sinoia, Southern Rhodesia, 31.1.44 (C. V. Meeser).

Easily separated from other species by the spotted wings and distinctive male terminalia.

#### SIPHONAPTERA

##### **Chiastopsylla monticola** sp. nov. (Fig. 5 a, b, c.)

*Male*, length of hind tibia 0.3 mm. *Head*, internal incrassation of frons well marked and extending up to the frontal tubercle; eye well developed and pigmented; genal comb of two pigmented spines; ratio of length of labial palp to hind tibia 0.84. *Thorax*, pronotal comb of 12 spines the majority of which are longer than the pronotum itself; metanotum with 4 teeth apically; mesonotum with 4 pseudosetae. *Legs*, hind tibia with 8 posterior notches bearing stout bristles; longest bristle at apex of hind tarsus 2 does not reach apex of 3. *Abdomen*, the number of bristles and spines on the abdominal segments counting both sides together are:

Segment		1	2	3	4	5	6	7	8
Tergite	Ante- median	7	5	4	2	2	2	2	—
	Median	10	14	14	13	13	12	13	—
	Spines	2	2	2	2	1	—	—	—
Sternite		—	2	6	6	5	6	4	5

*Terminalia*, sternite 9 with 3 scales of which the apical one is short and very slender compared with the other two; greatest width of clasper about 0.6 of its length; manubrium gradually narrowing to a blunt point; movable process of clasper slightly more than 4 times as long as its greatest width, surface of clasper beneath movable process noticeably pigmented.

*Female*, length of hind tibia 0.34 mm. *Head*, internal incrassation of frons and interantennal suture conspicuously sclerotized; genal comb as in the male; ratio of length of labial palp to hind tibia 0.8. *Thorax*, pronotal comb as in the male and metanotum with 4 apical teeth; mesonotum with at least one pair of pseudosetae. *Legs*, hind tibia with 8 dorsal notches bearing stout setae. *Abdomen*, bristles and spines on the tergites much as in the male; sternites with more bristles on segments 2-7 as follows: 2, 8, 8, 8-10, 11-14; sternite 7 with a triangular sinus of variable depth and width; tergite 8 with about 25 bristles on each side, of these about 17 are lateral and the rest marginal or submarginal. *Spermatheca* as in *rossi* Waterst. 1909.

*Variations.* The most notable variation was seen in one male which had 4 setae on sternite 9, the additional one being placed between the narrow apical and broader subapical seta; in character it is midway between these two. In females the sinus in sternite 7 is rather variable and sometimes quite shallow but always with the apex sharply pointed and not rounded.

The species obviously resembles *rossi* and *numae* Roths. 1904. The relatively reduced apical scale on sternite 9, and this is constant in all specimens, immediately separates it from both of these. In *rossi* the clasper is more rounded apically and the movable finger longer and narrower. These are characters which place it closer to *numae*. The triangular sinus on sternite 7 of the female separates it readily from *rossi* and again places it near *numae* of which it might be regarded as a subspecies. The new species was found on the same host and at the same time with typical *rossi* so it is obviously distinct from that species.

*Holotype* ♂, paratypes 5 ♂♂, 6 ♀♀ off *Myotomys sloggetti robertsi* Hwt. on mountain pass 7600ft near Mashai River ford, Basutoland, 26.9.1953. In addition 27 ♂♂, 65 ♀♀ off the same host and locality. (R. Rose Innes, K. H. Schulz & R. Brydon).

***Chiastopsysylla roseinnesi* sp. nov. (Fig. 5 d, e, f, g.)**

*Male*, length of hind tibia 0.4 mm. *Head*, frontal tubercle prominent internal incassation of frons well marked; eye well pigmented; two genal spines; ratio of length of labial palp to hind tibia 1.0 *Thorax*, pronotum with a comb of 12 spines which are shorter than the pronotum itself and a median row of 12 long bristles; mesonotum with a basal row of delicate hairs, an antemedian of 14 small bristles, a median of 12 long bristles and 6 pseudosetae; metanotum with an antemedian row of 10 small, a median of 12 long bristles and 6 apical teeth. *Legs*, hind tibia with seven dorsal notches bearing stout setae; longest bristle on hind tarsus 2 not reaching apex of 3. *Abdomen*, the number of bristles and spines on the segments counting the two sides together are:

Segment		1	2	3	4	5	6	7	8
Tergite	Ante- median	9	8	8	9	7	8	7	—
	Median	10	14	15	14	14	13	12	—
	Spines	4	2	2	2	—	—	—	—
Sternite		—	2	6	6	6	5	6	9

*Terminalia*, sternite 9 broad, the apex smoothly rounded and carrying a dense patch of numerous short stoutish setae with curved tips; the clasper is broadest

nearer the apex which is smoothly rounded, the manubrium is unusually broad; movable process inserted near the apical margin is rather suddenly narrowed just beyond the middle, and about four times as long as its greatest width.

*Female*, length of hind tibia 0.4 mm *Head*, as in male but internal incassation of frons and tubercle smaller; interantennal suture sclerotized; ratio of length of labial palp to hind tibia 1.0 *Thorax*, pronotum with a comb of 12 spines which are shorter than the segment itself; metanotum with 6-8 apical spines; mesonotum with 6 pseudosetae. *Legs*, hind tibia with 6-7 dorsal notches bearing stout setae; notch 5 counting from the base is missing from some specimens and even when present does not bear a particularly strong seta. *Abdomen*, setae on the tergites 1-7 much as in the male, 8 with about 14 long bristles laterally and about 8 similar ones marginally or submarginally on each side, in addition about 10 smaller bristles on or near the margin; sternites 2-7 with bristles, counting both sides together, as follows: 2, 12, 12, 10, 10-11, 13-14; sternite 7 with a large hump medially. *Spermatheca*, somewhat irregular in outline as illustrated, the whole head pigmented. Holotype ♂, off *Myotomys sloggetti robertsi* Hwt. in the Menoaneng area, Basutoland, 8500ft; 28.9.53. Paratypes 8 ♂♂, 8 ♀♀ off *Otomys irroratus* subsp., *Mystromys albicaudatus fumosus* Thos. & Sch. and *Myotomys sloggetti robertsi* all from Mokhotlong, Basutoland, 7000ft. 29.9.53-5.10.53 (R. Rose Innes, K. H. Schulz and R. Bryden).

This species, the largest known, belongs to the *numae* group. It is immediately separable from other members of the group in the male by the shape of the clasper, the dense patch of stout spines on sternite 9 and other details; in the female by the large hump on sternite 7 and the irregular shape of the head of the spermatheca.

The species is named in honour of Mr R. Rose Innes, Plague Laboratory, Union Health Department, who has been collecting Siphonaptera and other ectoparasites for us for many years.

### ***Hypsophthalmus montivagans* sp. nov. (Fig. 6 a, b, c, d.)**

*Male*, length of hind tibia 0.42 mm *Head*, frons rounded as far as the frontal tubercle from which an internal sclerotic tuber runs inwards to the eye; below the tubercle the frons is almost straight and strongly sclerotized; eye well developed and pigmented; genal comb of five strong spines which run in a slight curve from the eye to the base of the frons; the central spine is the longest and all except the most dorsal one are tapered to sharp points; laciniae minutely serrated; labial palp with 4 segments; ratio of length of labial palp to hind tibia 0.55. *Thorax*, pronotum with a comb of 14 pointed spines which are longer than the segment itself and 10 long bristles; metanotum without any apical teeth; mesonotum with 2 pairs of pseudosetae. *Legs*, hind tibia with 8 dorsal notches bearing strong setae; tarsus 1 of the hind leg longer than t2, tarsi 1 and 2 of the mid leg subequal. *Abdomen*, the number of bristles and spines on the segments counting the two sides together are:



Segment		1	2	3	4	5	6	7	8
Tergite	Ante- median	8	11	4	2	—	—	—	—
	Median	8	12	13	13	13	13	12	—
	Spines	2	4	2	2	—	—	—	—
Sternite		—	2	4	4	4	4	4	11

*Terminalia*, sternite 8 with 5 marginal bristles on one side and 6 on the other, in addition there are two short stout setae internally and the apical margin is produced distally into a densely haired membranous lobe; sternite 9 with the apical portion roughly shoe-shaped bearing two long bristles and a small spine; clasper large, rounded apically and with a very stout blunt spine at the ventro-apical angle; movable process slightly broader apically than basally, curved, with a beak-like termination and projecting slightly beyond the border of the clasper; manubrium of the clasper broad and turned up at the apex; apex of the ejaculatory duct strongly curved and provided with a dorsal tooth; paramere with a long apico-dorsal process.

*Female* unknown

Holotype ♂, paratypes 2 ♂♂ off *Otomys irroratus* subsp., Menoaneng area, Basutoland, 8500ft, 27.9.53 (R. Rose Innes, K. H. Schulz & R. Bryden).

The new species is obviously a *Hypsophthalmus* J. & R. 1913 in spite of the pointed genal spines as in *Chimaeropsylla* Roths. 1912. *C. haddowi* Smit 1952 is another species which tends to bridge the gap between these two genera. The three outstanding features of *potis* Roths. 1911, the genotype of *Chimaeropsylla*, namely, the coarsely serrated laciniae, wide buccal cavity and peculiar internal tuber of the frons are not shared by either *haddowi*, *montivagans* sp. nov., *campestris* J. & R. 1913 or *temporis* de M 1940. If these characters, therefore, be used to define *Chimaeropsylla* then there can be no confusion with *Hypsophthalmus* though, of course, it would mean transferring *haddowi* to the latter.

The pointed genal spines and character of the male terminalia immediately separates *montivagans* from *campestris* and *temporis*. From *haddowi*, if this be regarded as a *Hypsophthalmus*, it differs abundantly and mention need only be made of the rounded clasper, shape of the 9th sternite and row of bent bristles on the 8th sternite.

### ***Xenopsylla cryptonella* sp. nov. (Fig. 6 e.)**

*Male*, length of hind tibia 0.36 mm. *Head*, eye well developed and pigmented; occipital groove continued onto pronotum, at its greatest depth

about equal to the width of the eye; ratio of length of labial palp to hind tibia 1.2. *Thorax*, metathorax with a complete sinus between sternum and episternum. *Legs*, fore tarsal segment 5 with 4 ventral apical spiniform bristles; hind coxa with 6-7 short spines on the inside; hind tibia with 6 dorsal notches bearing stout bristles. *Abdomen*, sternites 2-8 with bristles on the two sides together as follows: 2, 4, 4, 4, 4, 4, 7. *Terminalia*, 9th sternite of more or less even width and broadly rounded apically; P2 pointed apically and ending at about the same level as P1; paramere with a long, pointed anterior projection much as in *erilli*; ejaculatory duct more or less parallel sided, with a number of minute denticles near the apex, a small dorsal tooth and a rather large membranous lobe ventrally; internal plate widens gradually from a narrow base to a smoothly rounded apex; internal coil not extending much beyond the dorsal margin of the plate; manubrium of the clasper parallel sided.

Holotype ♂, paratypes 16 ♂♂, all off *Xerus inauris* (Zimm. I), Cape Ground Squirrel, Holfontein, Orange Free State, April 1939 (D. H. S. Davis).

Nearest to *erilli* Roths. 1904 from which it is readily distinguished by the shape of the ejaculatory duct, P2 of the clasper and the 9th sternite (Fig. 6 f). Females do not appear to differ from *erilli*. For many years this species has been mistaken for *erilli* both here and at the British Museum. In addition to the type series other specimens in our collection all come from the Orange Free State and Transvaal except one which was collected at Vryburg in the Northern Cape. Specimens labelled *erilli* in the British Museum from the Orange Free State and Transvaal and recorded as such in "Catalogue of the Rothschild Collection" I, 322, 1953 also prove to be the new species. From present evidence therefore *erilli* appears to be restricted to the western drier regions extending from the western and northern Cape through Bechuanaland into S. W. Africa. The two species overlap at Jacobsdal near the western boundary of the Orange Free State.

We are grateful to Mr G. H. E. Hopkins and Mr F. G. A. M. Smit of the British Museum for lending us paratypes of *erilli* and sending us sketches of the important features of the holotype which have enabled us to establish the identity of the new species.

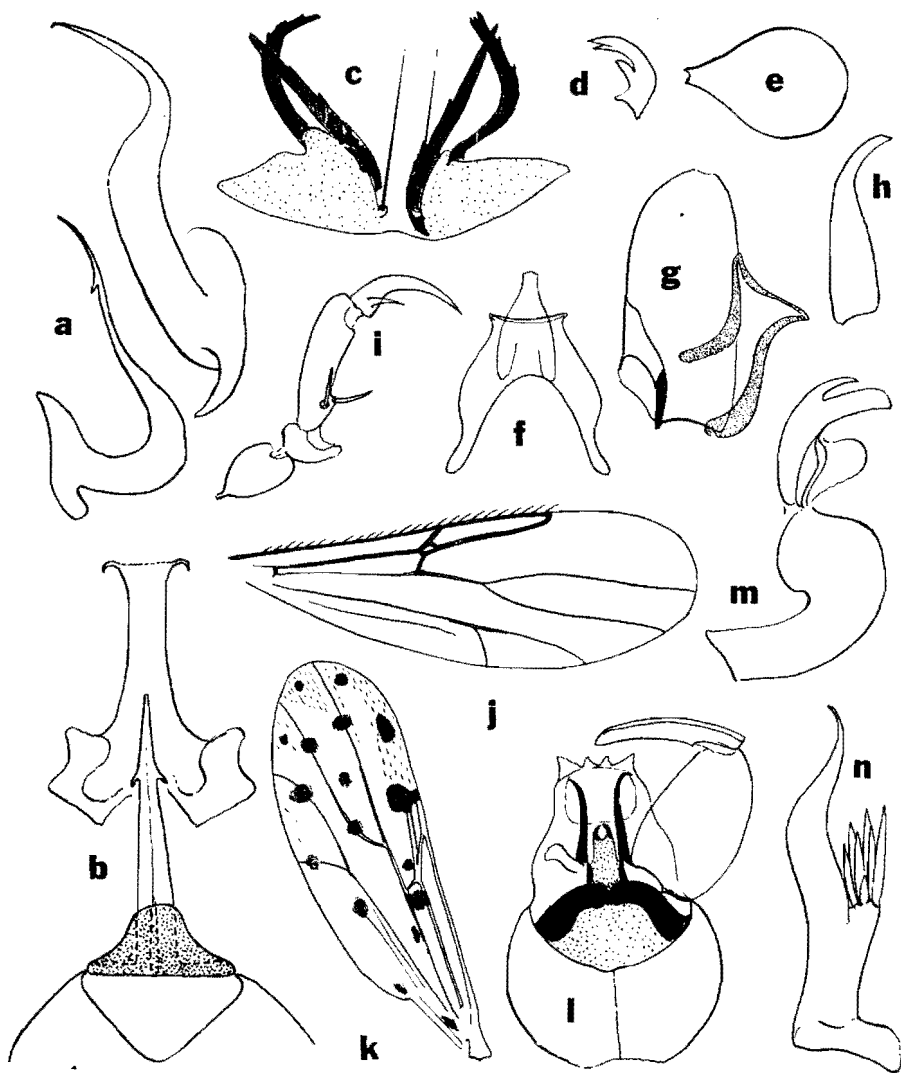


Figure 1. *Bezzia hopkinsi* sp.nov. a.aedeagus and paramere, side view. b.aedeagus and paramere, ventral view. *Atrichopogon victoriae* de M. c.female 7th sternite. d.female mid claw. e.spermatheca. *Atrichopogon turneri* I & M. f.aedeagus, ventral view. g.aedeagus and coxite, side view. h. style. *Stilobezzia bata* sp.nov. i. tarsi 3-5 of hind leg of female. j.female wing. *Alluaudomyia vudu* sp.nov. k.male wing. l.male terminalia. m. aedeagus, side view. n. paramere, side view.

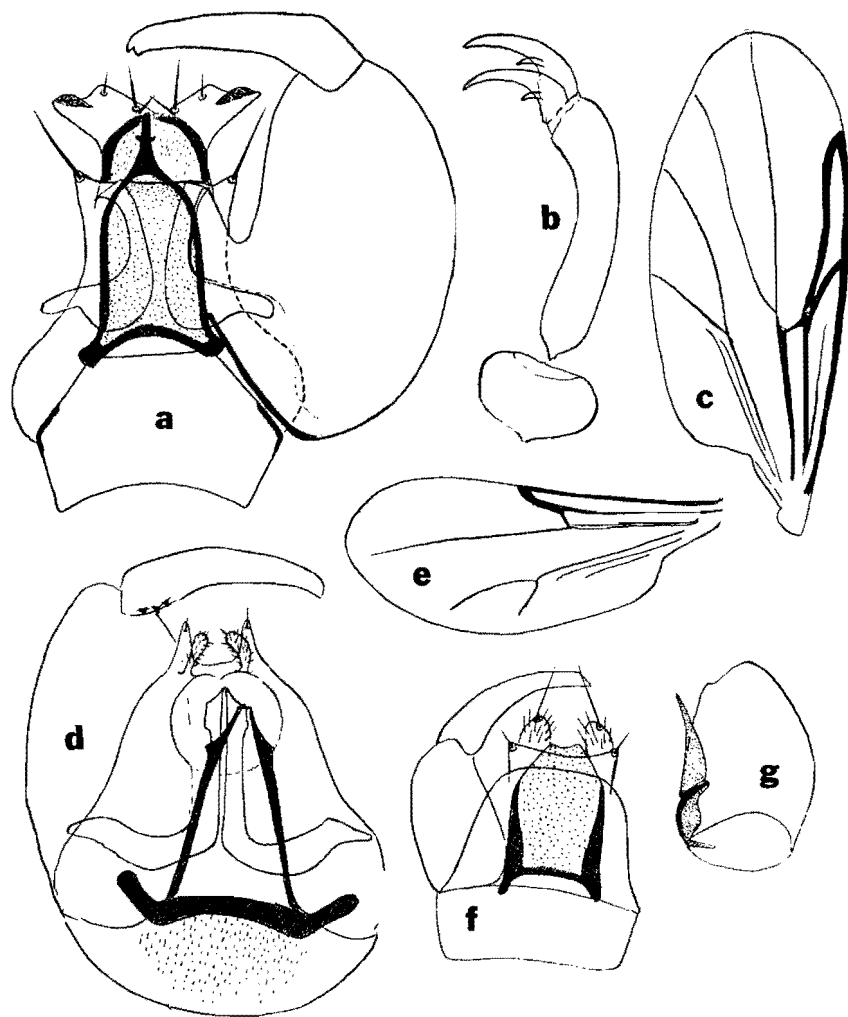


Figure 2. *Parabezzia capensis* sp. nov. a. male terminalia. b. female, 4th & 5th hind tarsi. c. male wing. *Alluaudomyia bimater* de M. d. male terminalia. *Ceratopogon (B) corius* sp. nov. e. male wing. f. male terminalia. g. male terminalia in side view.

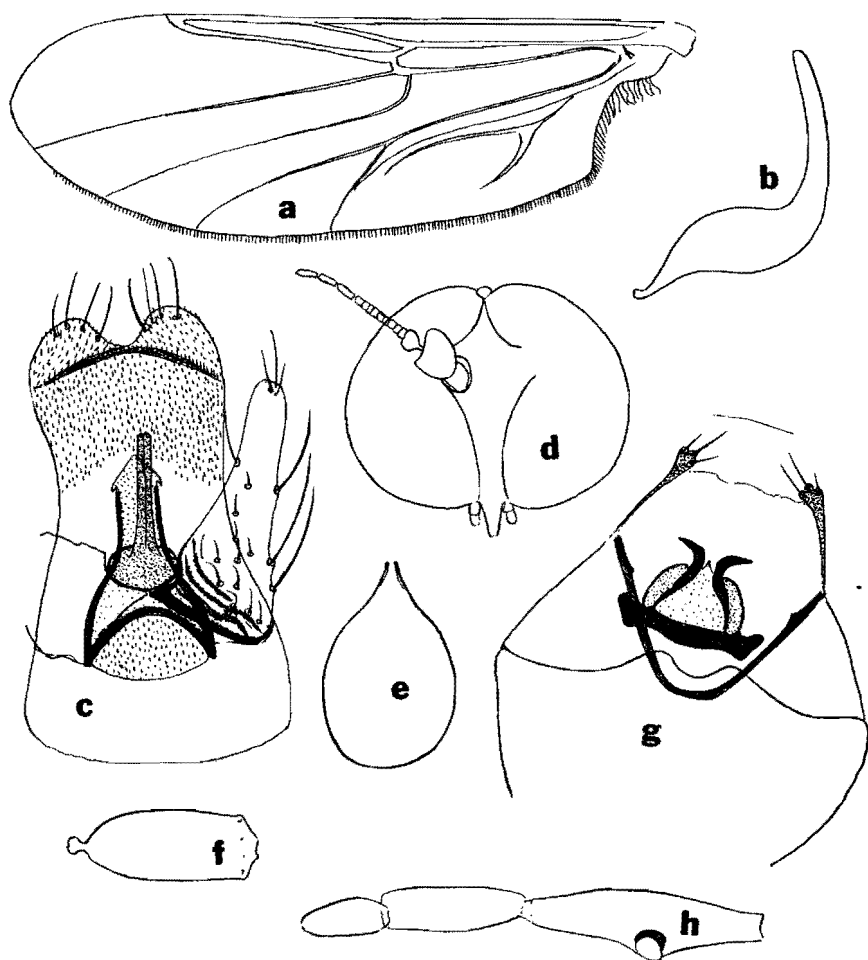


Figure 3. *Nilobezzia capensis* sp. nov. a. female wing. b. male paramere, side view. c. male terminalia. d. male head. *Forcipomyia mopsus* sp. nov. e. spermatheca. f. female, terminal segment of antenna. g. male terminalia. h. female palp.

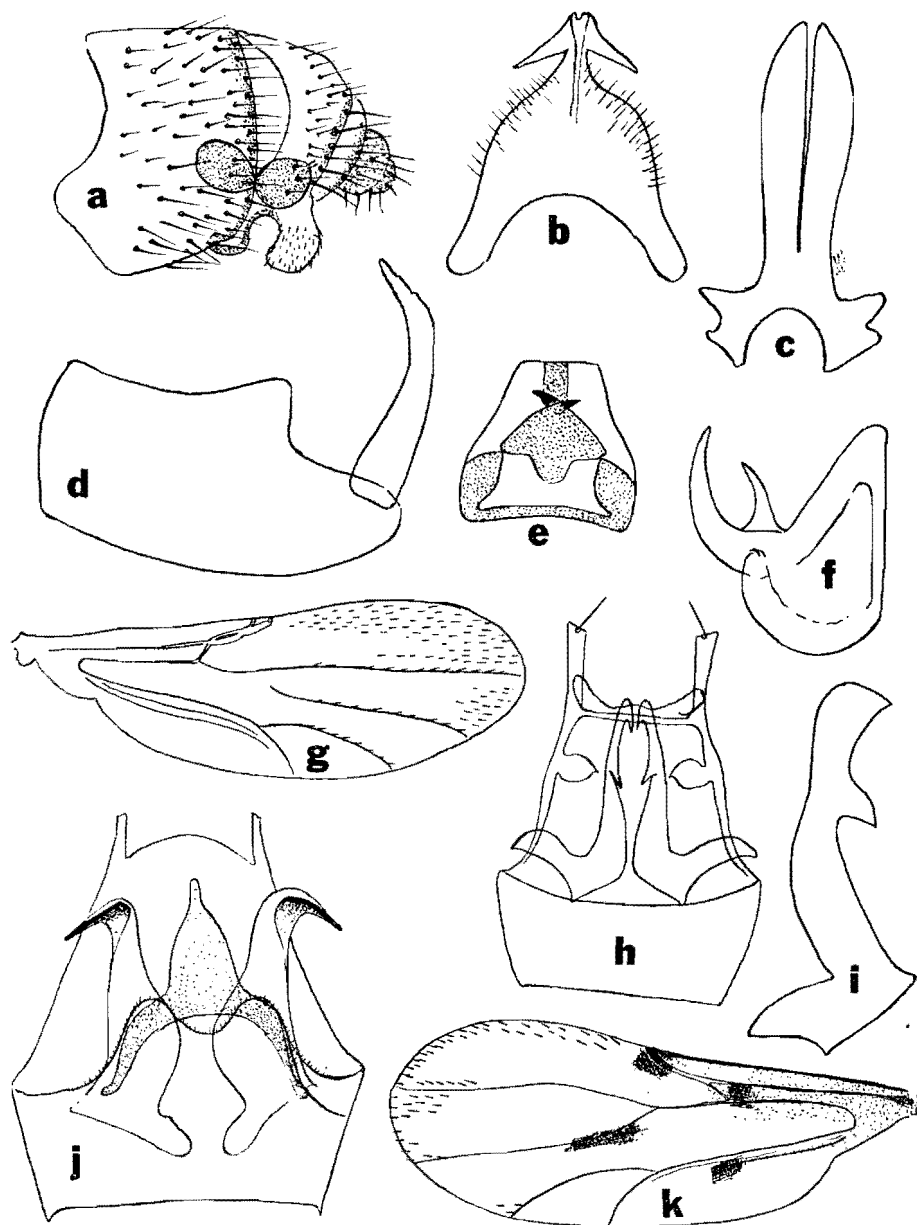


Figure 4. *Palpomyia oliffi* sp. nov. a. female, side view of apex of abdomen. b. male, aedeagus in ventral view. c. parameres, ventral view. d. coxite and style, side view. *Ceratopogon alcides* sp. nov. e. male, aedeagus in ventral view. f. aedeagus, side view. g. wing. h. 9th segment and parameres. i. paramere in side view. *C. meeseri* sp. nov. j. male, terminalia. k. wing.

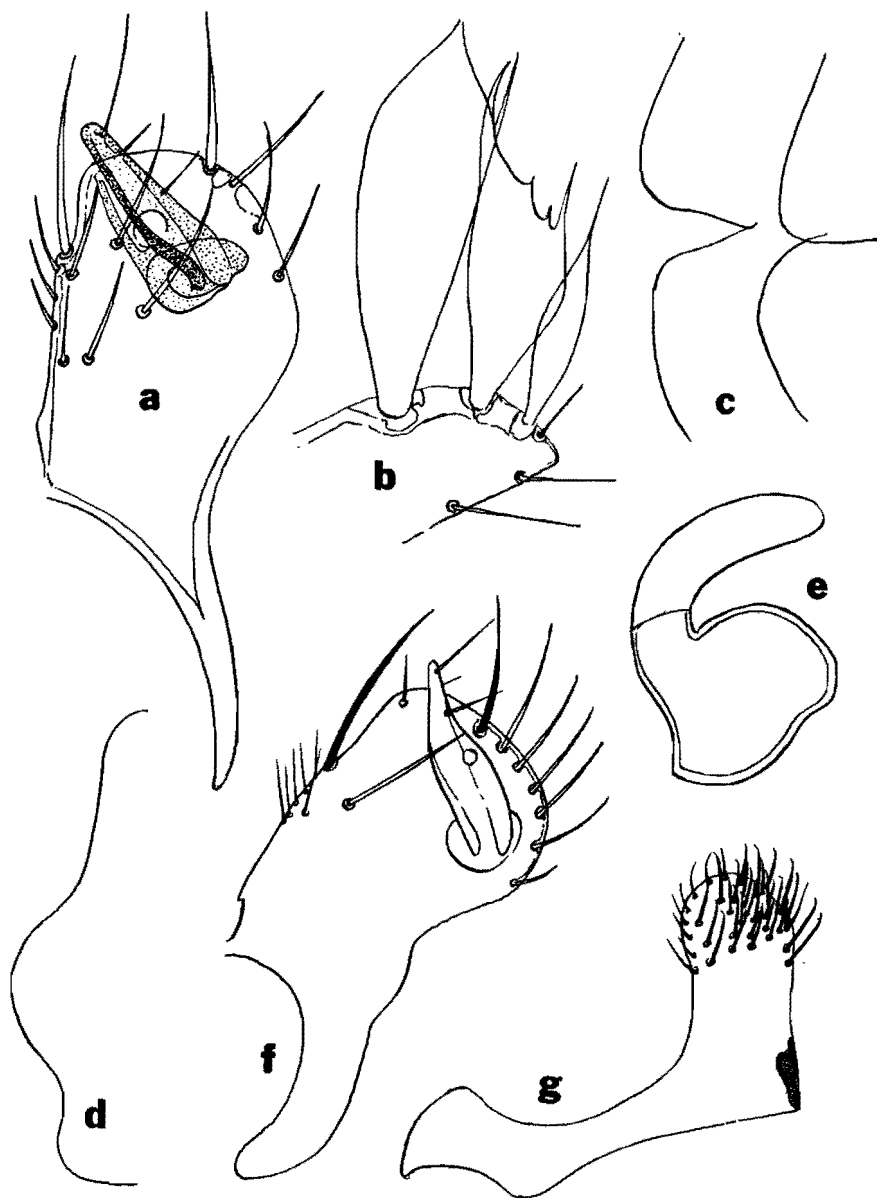


Figure 5. *Chiastopsylla monticola* sp. nov. a. male, clasper. b. apex of the 9th sternite. c. female, 7th sternite of two specimens showing variation. *Ch.roseinnesi* sp. nov. d. female, 7th sternite. e. spermatheca. f. male, clasper g. 9th sternite.

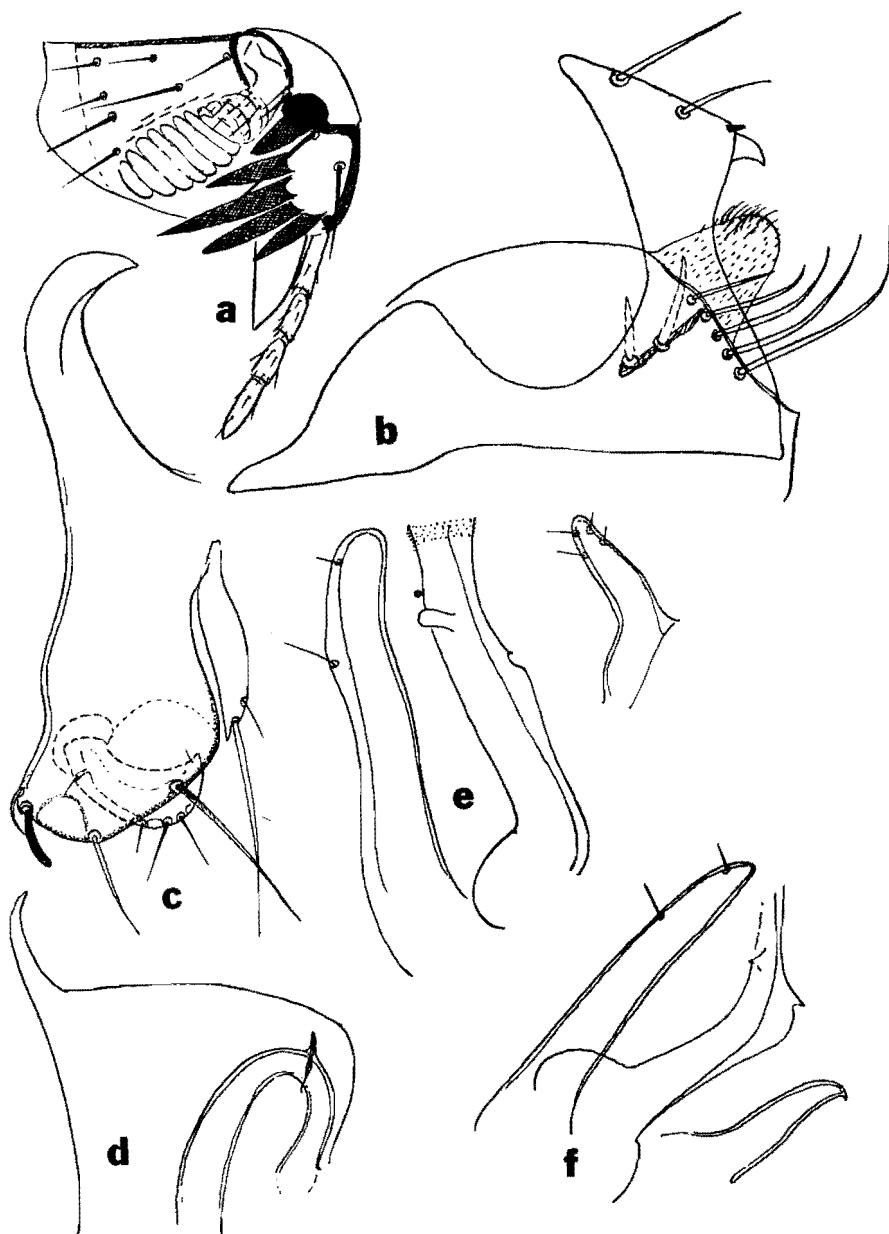


Figure 6. *Hypsophthalmus montivagans* sp. nov. a. male, head. b. 8th and 9th sternites. c. clasper. d. paramere and apex of ejaculatory duct. *Xenopsylla cryptonella* sp. nov. e. male, 9th sternite, ejaculatory duct and P2. *Xenopsylla erili* Roths. f. 9th sternite, ejaculatory duct and P2.